No. 200500340

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Colorado Wheat Research Foundation

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR MARKETING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) MAY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'Hatcher'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this fifth day of June, in the year two thousand and six.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions* — Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER: Colorado Wheat Research Foundation

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME: CO980607

3. VARIETY NAME: Hatcher

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*: 7100 South Clinton Street Suite 120 Centennial, CO 80112

5. TELEPHONE *(include area code)*: 303-721-3300

6. FAX *(include area code)*: 303-721-7555

FOR OFFICIAL USE ONLY

PVPO NUMBER: 200500340

FILING DATE: Sept. 2, 2005

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*: Research Foundation

8. IF INCORPORATED, GIVE STATE OF INCORPORATION:

9. DATE OF INCORPORATION:

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*
Scott D. Haley, Ph.D.
Soil and Crop Sciences Dept.
Colorado State University
Fort Collins, CO 80523

FEES RECEIVED

FILING AND EXAMINATION FEES: $ 3652.00 DATE 9-02-2005

CERTIFICATION FEE: $ 768.00 DATE APRIL 4, 2005

11. TELEPHONE *(Include area code)*: 970-491-6483

12. FAX *(Include area code)*: 970-491-0564

13. E-MAIL: scott.haley@colostate.edu

14. CROP KIND *(Common Name)*: Wheat, Common

15. GENUS AND SPECIES NAME OF CROP: Triticum aestivum

16. FAMILY NAME *(Botanical)*: Graminaceae

17. IS THE VARIETY A FIRST GENERATION HYBRID? ☐ YES ☒ NO

18. DOES THE VARIETY CONTAIN ANY TRANSGENES? *(OPTIONAL)* ☐ YES ☒ NO
IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERICALIZATION. _____

19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)
- a. ☒ Exhibit A. Origin and Breeding History of the Variety
- b. ☒ Exhibit B. Statement of Distinctness
- c. ☒ Exhibit C. Objective Description of Variety
- d. ☒ Exhibit D. Additional Description of the Variety *(Optional)*
- e. ☒ Exhibit E. Statement of the Basis of the Owner's Ownership
- f. ☒ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
- g. ☒ Filing and Examination Fee ($3,652), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act)*
☒ YES *(If "yes", answer items 21 and 22 below)* ☐ NO *(If "no", go to item 23)*

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES?
☒ YES ☐ NO
IF YES, WHICH CLASSES? ☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED

22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ YES ☐ NO
IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS.
FOUNDATION ☐ REGISTERED ☐ CERTIFIED
(If additional explanation is necessary, please use the space indicated on the reverse.)

23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
☒ YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☐ YES ☒ NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

25. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER		SIGNATURE OF OWNER	
NAME *(Please print or type)*: Scott Haley		NAME *(Please print or type)*	
CAPACITY OR TITLE: Professor	DATE: 8/26/05	CAPACITY OR TITLE	DATE

(See reverse for instructions and information collection burden statement)

INSTRUCTIONS

20050340

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for $3,652 ($432 filing fee and $3,220 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office
Telephone: (301) 504-5518
FAX: (301) 504-5291
Homepage: http://www.ams.usda.gov/science/pvpo/pvpindex.htm

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that name has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, 10301 Baltimore Avenue, Suite 401 NAL Building, Beltsville, MD 20705. Telephone: (301) 504-5682 http://www.ams.usda.gov/lsg/seed.htm.

ITEM

19a. Give:
(1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:

(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, *etc.*

19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

20. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of certified seed)*, the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

23. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

24. *See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.*

22. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

23. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

September 5, 2004 seed sold in Colorado, USA

24. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

PVP Application
Hatcher Hard Red Winter Wheat
Exhibit A – Origin and Breeding History of the Variety

Pedigree – Hatcher was selected from the following crosses and backcrosses:

Yuma/PI 372129//TAM-200/3/4*Yuma/4/KS91H184/Vista

Experimental designations – Hatcher was assigned the experimental identification number CO980607 in 1998. Hatcher is designated as PI 638512 in the U.S. National Plant Germplasm System.

Parents – The parents of Hatcher are:

1) Yuma – a wheat cultivar developed and released by Colorado State University in 1991. Yuma is designated as PI 559720 in the U.S. National Plant Germplasm System.

2) PI 372129 – a Russian wheat aphid-resistant landrace from Turkmenistan that carries the *Dn4* Russian wheat aphid resistance gene. PI 372129 is the source of the *Dn4* Russian wheat aphid (*Duiraphis noxia* Mordvilko) in Hatcher and other Russian wheat aphid resistant cultivars released by Colorado State University.

3) TAM-200 – a wheat cultivar developed and released by Texas A&M University in 1987. TAM-200 is designated as PI 578255 in the U.S. National Plant Germplasm System.

4) KS91H184 – an experimental line from Kansas State University derived from a random mating population involving CI 17884.

5) Vista – a wheat cultivar released by the University of Nebraska in 1992. Vista is designated as PI 562653 in the U.S. National Plant Germplasm System.

Following are the breeding procedures used in the development of Hatcher:

1989 – In spring 1989, Yuma was crossed as female with PI 372129 as male in the greenhouses at Fort Collins, Colorado. In fall 1989, an F1 plant from this cross was crossed as female with TAM-200 as male.

1990 – In spring 1990, F1 seedlings from the cross Yuma/PI 372129//TAM-200 were vernalized in a cold chamber for 8 weeks at 2-4 °C. Following vernalization, plants were screened for resistance to Russian wheat aphid biotype 1 in standard greenhouse screening tests. One plant showing resistance to Russian wheat aphid biotype 1 was crossed as female to Yuma as male. This process was repeated in fall 1990 to generate the first backcross (Yuma/PI 372129//TAM-200/3/2*Yuma).

1991 – In fall 1991, F1 seedlings from the cross Yuma/PI 372129//TAM-200/3/2*Yuma were vernalized and screened for Russian wheat aphid biotype 1 resistance as described above. One plant showing resistance was crossed as female to Yuma as male to generate the second backcross (Yuma/PI 372129//TAM-200/3/3*Yuma).

1992 – In fall 1992, F1 seedlings from the cross Yuma/PI 372129//TAM-200/3/3*Yuma were vernalized and screened for Russian wheat aphid biotype 1 resistance as described above. One plant showing resistance was crossed as female to Yuma as male to generate the third backcross (Yuma/PI 372129//TAM-200/3/4*Yuma). A separate cross was made in fall 1992 between KS91H184 as female and Vista as male.

1993 – In fall 1993, F1 seedlings from the cross Yuma/PI 372129//TAM-200/3/4*Yuma were vernalized and screened for Russian wheat aphid biotype 1 resistance as described above. A single BC3F1 plant showing resistance was crossed as female to an F1 plant from the cross KS91H184/Vista.

1994 – In 1994, the F1 of Yuma/PI 372129//TAM-200/3/4*Yuma/4/KS91H184/Vista was increased in the field at Fort Collins, CO, with planting in mid-February 1994. Seed was harvested in summer 1994 and planted as an F2 bulk population in September 1994.

1995 – The F2 bulk population was grown in the field at Fort Collins, CO, along with a group of approximately 600 other F2 bulk populations in the breeding program. Selection among bulks was practiced by visual selection for maturity, plant height, straw strength, and overall agronomic adaptation. Seed of the bulk population was combine harvested in summer 1995 and planted as an F3 bulk population in September 1995.

1996 – The F3 bulk population was grown in the field at Fort Collins, CO, along with a group of approximately 400 other F3 bulk populations in the breeding program. Selection among bulks was practiced by visual selection for maturity, plant height, straw strength, and overall agronomic adaptation. Seed of the bulk population was combine harvested in summer 1996 and planted as an F4 bulk population in September 1995.

1997 – The F4 bulk population was grown in the field at Fort Collins, CO, along with a group of approximately 200 other F4 bulk populations in the breeding program. Selection among bulks was practiced by visual selection for maturity, plant height, straw strength, and overall agronomic adaptation. Selection of single heads within desirable bulk populations was done based on random head selection of approximately 100 heads within each bulk population. Seed of individual head selections was planted as F4:5 (F4-derived F5) headrows in September 1997.

1998 – F4:5 headrows were grown at Fort Collins, CO. Line selections were made in July 1998 based on visual selection for maturity, plant height, straw strength, and overall agronomic adaptation. Seed harvested from the F4:5 headrows was then evaluated for size and color uniformity, near infrared reflectance (NIR) protein content, NIR grain hardness, and sodium dodecyl sedimentation volume. An F4:5 line selection designated as CO980607 was advanced for further testing following selection based on these criteria.

1999 – The F4:6 was tested in the single-replication preliminary yield nursery at five CO locations (Akron, Burlington, Fort Collins, Julesburg, Walsh). Line CO980607 was advanced for further testing based on selection for grain yield, test weight, plant height, maturity, and overall agronomic adaptation.

2000 – The F4:7 was tested in the replicated advanced yield nursery at the same five locations described above. Grain harvested from the trials in July 2000 was used for end-use quality evaluations in August 2000, including NIR protein content, NIR grain hardness, and mixograph water absorption, mixing time, and mixing tolerance. Data and observations from the field evaluations (grain yield, test weight, plant height, maturity, overall agronomic adaptation) and quality evaluations were used as selection criteria for advancement of CO980607 for further testing.

2001 – The F4:8 was tested in the replicated Uniform Variety Performance Trial (UVPT) at 10 CO locations (Akron, Bennett, Burlington, Cheyenne Wells, Genoa, Julesburg, Lamar, Orchard, Sheridan Lake, Walsh). Grain harvested from the trials in July 2001 was used for end-use quality evaluations in August 2001, including NIR protein content, NIR grain hardness, and mixograph water absorption, mixing time, and mixing tolerance. Data and

observations collected from the field evaluations (yield, test weight, plant height, maturity, overall agronomic adaptation) and quality evaluations were used as selection criteria for advancement of CO980607 for further testing. Seed purification of CO980607 was initiated by random selection of 150 F4:8 heads from small increase plots grown at Fort Collins, CO, in 2001. The F4:8 head selections were planted as F8:9 headrows in November in Yuma, AZ.

2002 – The F4:9 was tested in the replicated Uniform Variety Performance Trial at the same 10 CO locations listed above and in the Irrigated Variety Performance Trial (IVPT) at three CO locations (Fort Collins, Haxtun, Rocky Ford). Grain harvested from the trials in July 2002 was used for small-scale end-use quality evaluations as described above and experimental baking quality evaluations during winter 2002-2003. Data and observations collected from the field evaluations (yield, test weight, plant height, maturity, overall agronomic adaptation) and quality evaluations were used as selection criteria for advancement of CO980607 for further testing. Line CO980607 was also entered in the 2003 USDA-ARS Southern Regional Performance Nursery, planted in fall 2002. Off-type F8:9 headrows were removed from the headrow purification in Yuma, AZ, and 135 remaining headrows were composited. Breeder seed was planted from this composite in Fort Collins, CO, in September 2002.

2003 – The F10 was tested in the replicated Uniform Variety Performance Trial and the Irrigated Variety Performance Trial at the same locations listed above. Grain harvested from the trials in July 2003 was used for small-scale end-use quality evaluations as described above and experimental baking quality evaluations during winter 2003-2004. Data and observations collected from the field evaluations (yield, test weight, plant height, maturity, overall agronomic adaptation) and quality evaluations were used as selection criteria for advancement of CO980607 for further testing. CO980607 was entered for a second year of testing in the 2004 USDA-ARS Southern Regional Performance Nursery, planted in fall 2003. The breeder seed (F8:10) was grown under irrigation at Fort Collins, CO. Foundation seed (F8:11) was planted under irrigation in Colorado in fall 2003.

2004 – The F11 was tested in the replicated Uniform Variety Performance Trial and the Irrigated Variety Performance Trial at the same locations listed above. A six-acre Foundation Seed increase was grown under irrigation in Colorado. Based on yield performance, test weight, and end-use quality, CO980607 was assigned the name Hatcher and released for sale to seed producers in September 2004.

Hatcher is uniform. Variants are limited to: (1) slightly taller plants that occur at a frequency of less than 1 in 1,000 plants and (2) plants with brown glumes that occur at a frequency of less than 1 in 1,000 plants. The variants in Hatcher as well as the typical plants in Hatcher are commercially acceptable.

Hatcher is stable. When sexually reproduced, Hatcher remains unchanged in its essential and distinctive characteristics. Hatcher was observed to be uniform and stable during the last four generations of seed increase (preliminary seed increase in 2001, **bulk seed increase** in 2002, Breeder seed increase in 2003, and Foundation seed increase in 2004).

PVP Application
Hatcher Hard Red Winter Wheat
Exhibit B – Statement of Distinctness

Hatcher is most similar to the hard red winter wheat cultivar Yumar but differs in the following characteristics:

1) Hatcher has a significantly longer coleoptile than Yumar.

The following data are coleoptile length data (in mm) for Hatcher and Yumar from trials where both cultivars were evaluated with seed grown at the same location.

Year	Nursery	Hatcher	Yumar	Difference
2000	AYN	91.3	66.7	24.6
2001	UVPT	74.0	59.0	15.0
2001	UVPT	70.0	67.0	3.0
2002	UVPT	74.6	63.5	11.1
2002	UVPT	75.4	65.7	9.7
2003	UVPT	74.3	63.1	11.3
2003	UVPT	68.3	60.0	8.3
2004	UVPT	75.3	61.2	14.1
2004	UVPT	76.7	64.1	12.7
2005	UVPT	96.2	61.5	34.7
2005	UVPT	76.5	61.7	14.8
	Average	**77.5**	**63.0**	**14.5 ****

** Significantly different based on a meaningfully paired Student's T Test procedure (T-statistics: t ratio = 5.61; df = 10; P<0.001; upper/lower 95% confidence interval = 8.7 – 20.2 cm).

2) Hatcher is significantly shorter under typical field conditions than Yumar.

The following data are plant height data (in cm) for Hatcher and Yumar from trials where both cultivars were grown together. Each value represents the average of three replications.

Year	Location	Hatcher	Yumar	Difference
2000	Burlington	69.9	75.2	-5.3
2000	Julesburg	62.2	66.0	-3.8
2000	Walsh	62.2	62.2	0.0
2001	Akron	88.1	89.7	-1.7
2001	Briggsdale	78.7	86.4	-7.6
2001	Burlington	62.7	64.3	-1.7
2001	Cheyenne Wells	61.0	71.1	-10.2
2001	Genoa	61.0	61.0	0.0
2001	Julesburg	86.4	83.8	2.5
2001	Lamar	55.9	68.6	-12.7
2001	Walsh	61.8	66.0	-4.2
2002	Fort Collins	67.7	62.7	5.1
2002	Haxtun	88.9	88.9	0.0
2002	Rocky Ford	91.4	81.8	9.7
2002	Akron	62.7	59.3	3.4
2002	Julesburg	45.7	47.4	-1.7
2003	Akron	85.5	90.6	-5.1
2003	Burlington	61.0	61.8	-0.8
2003	Cheyenne Wells	53.3	66.0	-12.7
2003	Julesburg	84.7	87.2	-2.5
2003	Orchard	66.0	61.0	5.1
2003	Walsh	49.1	57.6	-8.5
2004	Akron	58.4	61.0	-2.5
2004	Bennett	55.9	63.5	-7.6
2004	Fort Collins	67.7	79.4	-11.6
2004	Julesburg	61.0	66.0	-5.1
2004	Sheridan Lake	48.3	58.4	-10.2
2004	Yuma	63.5	63.5	0.0
2005	Akron	36.4	40.6	-4.2
2005	Arapahoe	55.9	45.7	10.2
2005	Burlington	43.2	47.4	-4.2
2005	Genoa	53.3	76.2	-22.9
2005	Julesburg	48.3	48.3	0.0
2005	Lamar	61.0	66.0	-5.1
2005	Sheridan Lake	66.0	58.4	7.6
2005	Walsh	66.9	67.7	-0.8
2005	Yuma	43.2	61.0	-17.8
	Average	**63.1**	**66.5**	**-3.4**

** Significantly different based on a meaningfully paired Student's T Test procedure (T-statistics: t ratio = 2.97; df = 36; P<0.01; upper/lower 95% confidence interval = 1.09 – 5.77 cm).

3) Hatcher is moderately resistant to stripe rust, Yumar is moderately susceptible.

The following data are stripe rust infection scores (1=very resistant, 9=very susceptible) for Hatcher and Yumar from trials where both cultivars were grown together. The stripe rust race composition present at each location was not known.

Year	Location	Hatcher	Yumar	Difference
2003	Akron	5	6	1
2004	Fort Collins	5	7	2
2005	Genoa	2	4	2
2005	Walsh	4	5	1
	Average	**4**	**5.5**	**1.5****

** Significantly different based on a meaningfully paired Student's T Test procedure (T-statistics: t ratio = 5.19; df = 3; P<0.05; upper/lower 95% confidence interval = 0.6 - 2.4 score).

Exhibit C

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

OBJECTIVE DESCRIPTION OF VARIETY
Wheat (*Triticum* spp.)

NAME OF APPLICANT (S)	TEMPORARY OR EXPERIMENTAL DESIGNATION	VARIETY NAME
Colorado Wheat Research Fnd.	CO980607	Hatcher

ADDRESS (*Street and No. or RD No., City, State, Zip Code and Country*)
Colorado Wheat Research Foundation
7100 South Clinton Street, Suite 120
Centennial, CO 80112 USA

FOR OFFICIAL USE ONLY

PVPO NUMBER
20500340

PLEASE READ ALL INSTRUCTIONS CAREFULLY:

Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g., [0][9][9] or [0][9]) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: _____. Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

[1]
1 = Common
2 = Durum
3 = Club
4 = Other (Specify) _____

2. VERNALIZATION:

[2]
1 = Spring
2 = Winter
3 = Other (Specify) _____

3. COLEOPTILE ANTHOCYANIN:

[1] 1 = Absent 2 = Present

4. JUVENILE PLANT GROWTH:

[2] 1 = Prostrate 2 = Semi-erect 3 = Erect

5. PLANT COLOR: (boot stage)

[2]
1 = Yellow-Green
2 = Green
3 = Blue-Green

6. FLAG LEAF: (boot stage)

[1] 1 = Erect 2 = Recurved
[1] 1 = Not Twisted 2 = Twisted
[2] 1 = Wax Absent 2 = Wax Present

7. EAR EMERGENCE:

[1][4][4] Number of Days (Average) From January 1
[0][3] Number of Days Earlier Than * Prowers 99
Same As * Yuma
[0][4] Number of Days Later Than * Prairie Red

*Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

8. ANTHER COLOR:

[1] 1 = Yellow 2 = Purple

20050034 0

9. PLANT HEIGHT: (from soil to top of head, excluding awns)

[0][6][6] cm (Average)

[ ][ ] cm Taller Than _____ *

Same As Halt *

[0][3] cm Shorter Than Yumar *

10. STEM:

A. ANTHOCYANIN

[1] 1 = Absent 2 = Present

B. WAXY BLOOM

[2] 1 = Absent 2 = Present

C. HAIRINESS (last internode of rachis)

[1] 1 = Absent 2 = Present

D. INTERNODE

[1] 1 = Hollow 2 = Semi-solid 3 = Solid

[5] Number of Nodes

E. PEDUNCLE

[1] 1 = Erect 2 = Recurved 3 = Semi-erect

[1][5] cm Length

F. AURICLE

[1] Anthocyanin: 1 = Absent 2 = Present

[1] Hair: 1 = Absent 2 = Present

11. HEAD: (At Maturity)

A. DENSITY

[2] 1 = Lax
2 = Middense (Laxidense)
3 = Dense

B. SHAPE

[1] 1 = Tapering
2 = Strap
3 = Clavate
4 = Other (Specify) _____

C. CURVATURE

[2] 1 = Erect
2 = Inclined
3 = Recurved

D. AWNEDNESS

[4] 1 = Awnless
2 = Apically Awnletted
3 = Awnletted
4 = Awned

12. GLUMES: (At Maturity)

A. COLOR

[1] 1 = White
2 = Tan
3 = Other (Specify) _____

B. SHOULDER

[2] 1 = Wanting 2 = Oblique
3 = Rounded 4 = Square
5 = Elevated 6 = Apiculate
7 = Other (Specify) _____

C. SHOULDER WIDTH

[1] 1 = Narrow
2 = Medium
3 = Wide

D. BEAK

[3] 1 = Obtuse
2 = Acute
3 = Acuminate

E. BEAK WIDTH

[1] 1 = Narrow
2 = Medium
3 = Wide

F. GLUME LENGTH

[2] 1 = Short (ca. 7mm)
2 = Medium (ca. 8mm)
3 = Long (ca. 9mm)

G. WIDTH

[2] 1 = Narrow (ca. 3mm)
2 = Medium (ca. 3.5mm)
3 = Long (ca. 4mm)

200500340

13. SEED:

A. SHAPE

[1] 1 = Ovate
2 = Oval
3 = Elliptical

B. CHEEK

[1] 1 = Rounded
2 = Angular

C. BRUSH

[2] 1 = Short
2 = Medium
3 = Long

[1] 1 = Not Collared
2 = Collared

D. CREASE

[1] 1 = Width 60% or less of Kernel
2 = Width 80% or less of Kernel
3 = Width Nearly as Wide as Kernel

[1] 1 = Depth 20% or less of Kernel
2 = Depth 35% or less of Kernel
3 = Depth 50% or less of Kernel

E. COLOR

[3] 1 = White
2 = Amber
3 = Red
4 = Other (Specify) _____

F. TEXTURE

[1] 1 = Hard
2 = Soft
3 = Other (Specify) _____

G. PHENOL REACTION (See Instructions)

[4] 1 = Ivory
2 = Fawn
3 = Light Brown
4 = Dark Brown
5 = Black

H. SEED WEIGHT

[31] g/1000 Seed (Whole number only)

I. GERM SIZE

[2] 1 = Small
2 = Midsize
3 = Large

14. DISEASE: PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

(0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

[3]	Stem Rust (*Puccinia graminis* f. sp. *tritici*) QFCS QTHJ RCRS TPMK TTTT – UNKNOWN RACES	[3]	Leaf Rust (*Puccinia recondita* f. sp. *tritici*) MLRT MFBP TKBP ~~TGBT~~ TBGT KBQT
[3]	Stripe Rust (*Puccinia striiformis*)	[0]	Loose Smut (*Ustilago tritici*)
[0]	Tan Spot (*Pyrenophora tritici-repentis*)	[0]	Flag Smut (*Urocystis agropyri*)
[0]	Halo Spot (*Selenophoma donacis*)	[0]	Common Bunt (*Tilletia tritici* or T. *laevis*)
[0]	*Septoria nodorum* (Glume Blotch)	[0]	Dwarf Bunt (*Tilletia controversa*)
[0]	*Septoria avenae* (Speckled Leaf Disease)	[0]	Karnal Bunt (*Tilletia indica*)
[0]	*Septoria tritici* (Speckled Leaf Blotch)	[0]	Powdery Mildew (*Erysiphe graminis* f. sp. *tritici*)
[0]	Scab (*Fusarium* spp.)	[0]	"Snow Molds"
[0]	"Black Point" (Kernel Smudge)	[0]	Common Root Rot (*Fusarium*, *Cochliobolus* and *Bipolaris* spp.)
[1]	Barley Yellow Dwarf Virus (BYDV)	[0]	Rhizoctonia Root Rot (*Rhizoctonia solani*)
[0]	Soilborne Mosaic Virus (SBMV)	[0]	Black Chaff (*Xanthomonas campestris* pv. *translucens*).
[0]	Wheat Yellow (Spindle Streak) Mosaic Virus	[0]	Bacterial Leaf Blight (*Pseudomonas syringae* pv. *syringae*)
[1]	Wheat Streak Mosaic Virus (WSMV)	[ ]	Other (Specify) _____
[ ]	Other (Specify) _____	[ ]	Other (Specify) _____
[ ]	Other (Specify) _____	[ ]	Other (Specify) _____
[ ]	Other (Specify) _____	[ ]	Other (Specify) _____

15. INSECT: (0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

[3]	Hessian Fly (*Mayetiola destructor*) Great Plains Biotype	[ ]	Other (Specify) _____
[0]	Stem Sawfly (*Cephus* spp.)	[ ]	Other (Specify) _____
[0]	Cereal Leaf Beetle (*Oulema melanopa*)	[ ]	Other (Specify) _____

15. **INSECT:** (continued) 0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant

PLEASE SPECIFY BIOTYPE (Where Needed) 20500340

[2]	Russian Aphid (*Diuraphis noxia*) Biotype 1	[ ]	Other (Specify) _____
[1]	Greenbug (*Schizaphis graminum*) C, E	[ ]	Other (Specify) _____
[0]	Aphids	[ ]	Other (Specify) _____

16. **ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:**

For Russian wheat aphid, biotype 1 is the new designation for the original, North American biotype.

WHEAT DESCRIPTOR ILLUSTRATIONS

Section Numbers Correspond to the Numbers of the Sections on the Form

20500340

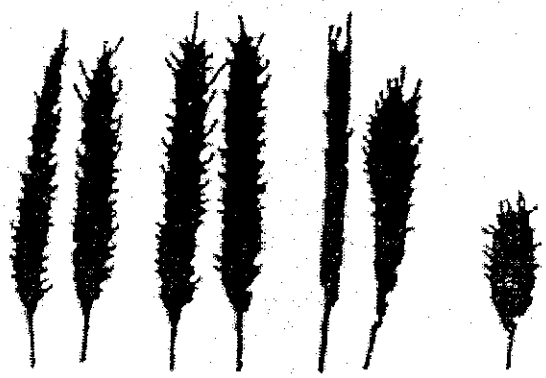
4. EARLY PLANT GROWTH HABIT:

1 Prostrate | 2 Intermediate | 3 Erect

10. STEM INTERNODE X-SECTION:

1 Hollow | 2 Semi-solid | 3 Solid

11. SPIKE SHAPE:

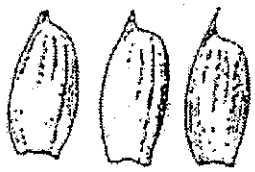


1 Tapering | 2 Oblong | 3 Clavate | 4 Elliptical

11. AWNEDNESS:

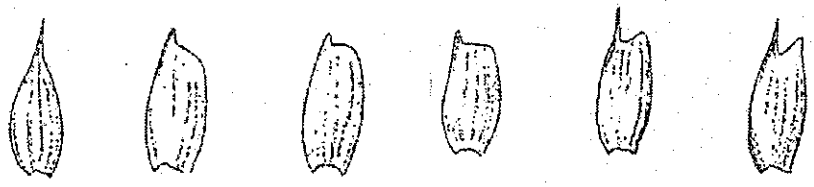
1 Awnless | 2 Apically Awnleted | 3 Awnleted | 4 Awned

12. BEAK SHAPE:



1 Obtuse | 2 Acute | 3 Acuminate

12. SHOULDER SHAPE:



1 Wanting | 2 Oblique | 3 Rounded | 4 Square | 5 Elevated | 6 Apiculate

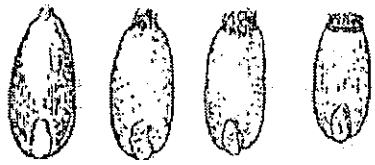
13. SEED SHAPE:

1 Ovate | 2 Oval | 3 Elliptical

13. CHEEK SHAPE:

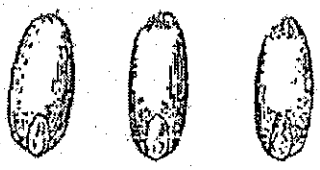
1 Rounded | 2 AngulaR

13. BRUSH SIZE



1 Small | 2 Midsized | 3 Large | 4 Collared

13. BRUSH HAIR LENGTH:



1 Short | 2 Medium | 3 Long

13. GERM (EMBRYO) SIZE:

1 Small | 2 Midsized | 3 Large

13. SEED CREASE WIDTH:

1 Narrow | 2 Mid-wide | 3 Wide

13. SEED CREASE DEPTH:

1 Shallow | 2 Mid-Deep | 3 Deep

13

PVP Application
Hatcher Hard Red Winter Wheat
Exhibit D – Additional Description of the Variety (optional)

The following additional descriptive information is presented:

1) Table 1: Agronomic data summary from the 2001-2004 Dryland Colorado Variety Performance Trials (UVPT).

2) Table 2: Grain yield and test weight for Hatcher and other entries tested in Dryland Colorado Variety Performance Trials (UVPT; 2001 to 2004).

3) Table 3: Grain yield, test weight, and lodging scores for Hatcher and other entries tested in Irrigated Colorado Variety Performance Trials (IVPT; 2002 to 2004).

4) Table 4: Grain yield for Hatcher and other entries tested in dryland High Plains locations of the 2003 Southern Regional Performance Nursery (SRPN).

5) Table 5: Grain yield for Hatcher and other entries tested in dryland High Plains locations of the 2004 Southern Regional Performance Nursery (SRPN).

6) Table 6: Milling and bread baking characteristics of Hatcher, Ankor, and Prowers 99 across three composite quality evaluations and three individual location evaluations between 2000 and 2002 (n=6 evaluations).

Table 1. Agronomic data summary from the 2001-2004 Dryland Colorado Variety Performance Trials (UVPT).

	Heading Date	Plant Height	Straw Strength	Coleoptile Length	Shattering Score
	--- days† ---	--- in ---	score‡	--- mm ---	score§
Hatcher	**143.5**	**25.8**	**2.0**	**73.6**	**3.6**
Prairie Red	139.7	26.4	2.0	85.0	4.1
Halt	139.7	25.8	2.0	69.6	5.0
Stanton	142.6	28.4	2.0	77.7	4.1
Ankor	142.9	27.4	2.7	77.4	2.7
Yumar	143.1	27.3	2.0	62.9	4.2
Prowers 99	146.5	31.4	5.3	91.6	3.6
Observations	5	22	1	8	3

† Days from January 1.
‡ 1=fully erect to 9=completely flat scale.
§ 1=minimal shatter to 9=severely shattered scale.

Table 2. Grain yield and test weight for Hatcher and other entries tested in Dryland Colorado Variety Performance Trials (UVPT; 2001 to 2004).

	Grain Yield				Multiple Year Averages			
					Grain Yield			Test Wt
Entry	2001	2002	2003	2004	2003-04	2002-04	2001-04	2001-04
	bu/a							lb/bu
Trego	47.8	34.3	52.9	47.7	50.5	47.0	47.3	59.7
Hatcher	**43.5**	**32.0**	**56.0**	**48.3**	**52.5**	**48.1**	**46.4**	**58.1**
Stanton	46.3	32.6	49.4	50.4	49.8	46.2	46.2	58.3
Above	41.9	34.5	52.8	51.4	52.2	48.4	46.0	57.2
Yuma	43.1	30.0	53.0	48.4	50.9	46.4	45.2	57.4
Ankor	41.6	33.7	51.8	48.3	50.2	46.7	44.8	57.5
Alliance	44.0	32.5	50.5	46.4	48.6	45.2	44.7	57.4
Jagger	46.7	31.7	46.0	47.3	46.6	43.4	44.6	57.8
Avalanche	41.3	31.6	50.4	50.6	50.5	46.5	44.6	59.0
Akron	43.2	33.2	49.6	46.7	48.3	45.1	44.4	57.6
Prairie Red	40.7	34.6	50.2	48.0	49.2	46.1	44.1	57.4
Yumar	40.7	30.8	50.3	48.7	49.6	45.6	43.8	58.0
Halt	42.9	34.7	46.7	41.9	44.5	42.4	42.6	57.3
Prowers 99	41.4	31.8	45.4	42.2	43.9	41.3	41.4	59.2
Average	42.7	32.8	50.1	47.7	49.0	45.6	44.5	57.9
Locations	8	3	6	5	11	14	22	22

Table 3. Grain yield, test weight, and lodging scores for Hatcher and other entries tested in Irrigated Colorado Variety Performance Trials (IVPT; 2002 to 2004).

	Grain Yield					Test Wt	Lodging†
Entry	2002	2003	2004	2003-04	2002-04	2002-04	2002-04
Yuma	92.6	107.1	114.6	110.1	105.1	57.2	1.8
Jagalene	92.4	115.1	100.7	109.4	104.5	58.3	1.9
Prairie Red	94.9	108.5	107.6	108.1	104.4	56.2	2.3
Wesley	90.9	107.1	98.6	103.7	100.1	57.9	1.1
Hatcher	**90.2**	**101.4**	**101.6**	**101.4**	**98.2**	**57.9**	**4.6**
Antelope	86.8	101.5	100.6	101.1	97.0	57.6	1.9
Dumas	84.3	100.3	101.0	100.6	95.9	58.8	1.0
Ok102	--	96.2	106.1	100.2	--	--	1.2
Ankor	88.7	94.3	108.9	100.1	96.9	56.2	3.9
Platte	95.8	98.8	92.5	96.3	96.2	57.2	1.0
Nuplains	89.5	81.0	99.9	88.5	88.8	58.1	1.8
Average	90.6	101.0	102.9	101.8	98.7	57.5	2.1
Locations	3	3	2	5	8	8	3

† 1=fully erect to 9=completely flat scale.

Table 4. Grain yield for Hatcher and other entries tested in dryland High Plains locations of the 2003 Southern Regional Performance Nursery (SRPN). **Hatcher and checks are bolded.**

ENTRY/ID		Hays	Colby	Akron	Julesburg	Burlington	N Platte	Sidney	Average
37	CO980630	77.1	91.5	89.5	74.0	51.9	56.7	60.5	71.6
36	**Hatcher**	**85.0**	**91.9**	**84.2**	**69.8**	**45.7**	**59.8**	**52.9**	**69.9**
30	KS940786-6-9	86.8	86.3	91.9	64.7	37.3	60.7	59.3	69.6
42	TX98V9628	87.3	83.7	83.5	73.6	46.1	52.6	50.6	68.2
25	OK94P549-11	81.8	81.3	86.2	72.8	44.8	67.8	40.7	67.9
31	W99-194	84.8	88.0	90.3	62.4	40.3	52.5	54.0	67.5
35	CO980376	70.5	85.1	92.3	66.3	40.8	63.1	46.9	66.4
39	CO99314	77.4	91.8	85.1	66.6	38.8	47.2	50.2	65.3
26	OK98690	83.3	78.7	81.8	60.5	36.3	58.2	57.5	65.2
41	TX99A0155	79.9	87.3	86.3	65.6	37.4	51.3	47.5	65.1
24	OK94P549-21	81.0	86.6	89.1	61.5	26.6	51.0	58.3	64.9
33	W96x1375-06	84.2	81.0	86.3	56.4	39.2	44.9	52.1	63.5
16	G980411W	68.2	85.3	74.7	69.6	39.3	58.0	48.8	63.4
4	**Trego**	**76.8**	**82.5**	**85.9**	**68.0**	**35.6**	**45.1**	**49.2**	**63.3**
7	T136	74.9	80.9	82.6	65.2	38.1	63.4	36.5	63.1
10	G982159	77.5	84.5	74.9	63.7	31.9	54.7	49.1	62.3
43	TX97V5300	79.7	84.2	79.3	64.6	36.8	49.0	42.0	62.2
23	OK98699	77.4	75.9	82.3	62.5	37.9	56.3	40.6	61.8
17	NE99543	77.6	81.7	76.7	62.4	34.7	52.5	47.1	61.8
34	W96x1311-01	78.0	87.4	81.5	61.5	29.1	50.6	43.8	61.7
22	OK95548-98-6654	81.1	69.2	86.0	59.8	27.5	62.8	45.5	61.7
46	TX99U8618	67.4	84.9	87.4	61.1	38.3	55.7	35.3	61.4
8	T137	74.4	81.1	75.3	59.7	30.1	59.9	47.8	61.2
9	KS00HW175-4	69.9	79.0	78.8	64.2	37.3	51.8	47.3	61.2
40	CO99W192	74.8	83.2	78.1	65.5	32.2	45.3	45.5	60.6
18	NE00429	71.3	84.6	72.2	54.1	37.9	51.1	52.9	60.6
44	TX96D1073	72.3	73.5	88.0	54.3	37.5	63.2	34.4	60.5
21	OK96705-99-6738	78.4	78.9	73.4	62.2	31.3	50.1	48.1	60.3
45	TX98D2316	73.6	76.5	91.7	59.1	20.2	49.7	51.5	60.3
3	**TAM-107**	**69.9**	**71.7**	**84.5**	**68.1**	**33.6**	**44.8**	**49.5**	**60.3**
15	G980129W	78.4	73.5	72.4	61.4	31.9	59.1	41.7	59.8
11	G982241	72.5	81.0	77.4	53.6	38.2	59.3	32.6	59.2
20	NE00564	71.1	78.1	68.3	65.3	31.9	57.7	40.4	59.0
28	KS940748-2-2	75.1	78.0	70.8	58.0	26.6	56.2	43.2	58.3
29	Overley	77.9	72.7	69.8	57.4	28.4	59.0	42.1	58.2
32	W96x1080-21	89.4	73.4	70.2	51.3	25.5	58.6	36.9	57.9
19	NE00544	71.4	78.7	65.5	58.7	32.5	54.9	43.4	57.9
27	OK99215	67.8	68.9	82.0	55.0	33.7	55.1	42.3	57.8
5	T133	68.5	70.0	82.8	58.3	35.3	46.9	37.2	57.0
6	T139	74.6	70.1	67.0	56.3	37.2	54.1	38.7	56.9
38	CO99141	71.2	82.2	73.7	57.4	30.6	37.8	44.6	56.8
13	G980122	63.8	70.6	72.6	62.7	28.3	57.3	39.2	56.4
12	G980039	84.7	70.8	69.2	58.5	22.2	50.8	35.7	56.0
14	G982163	73.5	60.0	66.8	49.9	34.2	50.5	33.3	52.6
2	**Scout 66**	**63.6**	**66.0**	**72.0**	**48.5**	**31.5**	**35.4**	**43.7**	**51.5**
1	**Kharkof**	**45.5**	**52.4**	**48.3**	**44.9**	**21.1**	**38.3**	**45.1**	**42.2**
	Average	75.5	78.8	78.9	61.2	34.4	53.5	45.3	
	LSD 0.05	7.1	11.3	14.2	7.6	6.1	13.3	13.5	
	CV %	5.7	8.7	10.9	7.5	10.8	15.2	18.1	

Table 5. Grain yield for Hatcher and other entries tested in dryland High Plains locations of the 2004 Southern Regional Performance Nursery (SRPN). **Hatcher and checks are bolded.**

ENTRY/ID		Colby	Hays	G City	Julesburg	Akron	Average
8	G980143	51.8	60.4	41.6	43.1	57.6	50.9
27	**Hatcher**	**51.5**	**59.4**	**38.1**	**43.2**	**60.8**	**50.6**
35	TX00D1390	48.0	64.9	43.3	42.9	49.9	49.8
45	KS01HW152-6	47.9	71.2	47.1	40.9	39.8	49.4
32	TX00V1117	43.5	68.0	38.0	38.0	58.5	49.2
26	CO970547-7	49.3	62.0	49.7	39.0	45.5	49.1
7	G991324	46.5	62.6	39.1	41.8	55.0	49.0
5	G990191	54.4	64.2	36.6	39.8	47.7	48.6
29	CO00016	47.3	64.3	44.9	42.6	43.6	48.5
44	W03-20	48.9	63.0	40.4	41.2	47.8	48.2
28	CO00D007	42.9	62.2	37.2	43.0	54.1	47.9
30	CO00698	42.7	64.3	35.3	44.8	50.2	47.5
41	W99-194	44.9	63.9	38.0	38.6	51.1	47.3
47	KS02HW34	46.6	60.9	41.6	38.0	49.1	47.2
37	NE00403	41.5	61.6	36.2	44.5	51.3	47.0
24	KS00F5-20-3	47.5	61.8	38.2	42.4	41.5	46.3
31	TX96D1073	46.1	62.9	33.6	38.7	47.6	45.8
3	TAM 107	49.2	55.2	39.1	40.0	45.2	45.7
39	NE01481	42.1	59.3	41.0	35.4	50.4	45.7
19	OK00514	47.4	62.9	34.4	36.6	45.7	45.4
22	KS950811-5-1	43.9	64.7	32.9	40.9	44.1	45.3
14	T136	50.8	52.0	40.8	39.1	43.6	45.3
4	**Trego**	**50.4**	**60.2**	**40.9**	**34.7**	**39.2**	**45.1**
15	T140	46.6	53.9	39.6	40.9	44.2	45.0
40	NE00564	42.4	51.9	42.1	38.7	47.8	44.6
34	TX01D3232	44.2	63.5	33.4	38.1	42.8	44.4
23	KS00F5-14-7	44.5	61.0	34.2	36.6	45.6	44.4
11	AP01T3131	46.2	53.1	36.8	39.2	46.1	44.3
36	TX01A5936	44.5	64.9	32.5	41.9	36.7	44.1
46	KS01HW163-4	49.3	56.0	32.9	37.3	43.0	43.7
12	NW99L7068	48.1	58.3	35.3	38.9	37.5	43.6
48	SD97W604	40.6	56.5	36.4	36.8	45.9	43.3
50	NW98S097	44.3	50.8	34.5	29.4	55.2	42.8
42	W96x1311-01	45.5	60.6	28.9	36.7	42.4	42.8
43	W98-159-7	39.1	57.5	34.8	38.3	43.8	42.7
20	OK99212	47.3	49.9	39.2	36.0	40.4	42.6
18	OK00618W	41.2	54.8	35.8	35.9	44.3	42.4
38	NE00435	42.3	54.8	35.5	39.5	39.0	42.2
13	T135	46.0	53.9	35.6	34.0	41.4	42.2
10	AP01T1114	44.2	50.7	33.4	33.4	45.7	41.5
2	**Scout 66**	**38.6**	**51.7**	**33.6**	**40.0**	**42.7**	**41.3**
25	KS00F5-57-8	43.4	53.4	29.6	35.1	45.1	41.3
49	CO991132	42.7	52.2	31.3	35.9	42.8	41.0
9	AP01T1112	45.0	46.0	29.7	35.8	48.2	40.9
21	OK00614	41.5	51.7	35.3	36.1	38.6	40.6
6	G982238-2	42.1	59.8	34.4	30.1	36.7	40.6
33	TX00V1131	42.1	52.7	30.1	26.0	48.6	39.9
17	OK00611W	38.8	52.0	28.6	36.9	30.0	37.3
16	T141	37.5	44.7	31.7	28.8	37.8	36.1
1	**Kharkof**	**29.8**	**40.8**	**30.0**	**30.2**	**40.7**	**34.3**
	Mean	44.9	57.8	36.5	37.9	45.4	
	LSD 0.05	7.0	6.9	6.7	6.4	7.2	
	CV	9.6	7.3	11.2	10.3	9.7	

Table 6. Milling and bread baking characteristics of Hatcher, Ankor, and Prowers 99 across three composite quality evaluations and three individual location evaluations between 2000 and 2002 (n=6 evaluations).

Trait (unit of measurement)	Hatcher	Ankor	Prowers 99
Grain volume weight (lb bu^{-1})	59.2	56.9	58.2
SKCS† kernel weight (mg)	28.5	25.2	26.3
SKCS kernel diameter (mm)	2.17	2.03	2.11
SKCS kernel hardness index (score)	71.8	73.3	80.0
Flour ash (g kg^{-1})	0.41	0.44	0.48
Flour extraction (g kg^{-1})	68.5	65.8	67.9
Flour protein content (%)	12.0	12.0	13.8
Mixograph water absorption (g kg^{-1})	61.8	61.5	64.9
Mixograph tolerance (score)‡	3.2	2.2	4.0
Mixograph mixing time (min)	3.2	2.9	4.0
Bake mix time (min)	4.2	3.6	5.1
Bake water absorption (g kg^{-1})	60.0	60.4	63.3
Loaf volume (L)	0.872	0.888	0.945
Crumb grain score (score)§	3.8	4.0	4.5

† Single kernel characterization system (SKCS).

‡ Mixograph tolerance score: 6=outstanding, 0=unacceptable.

§ Crumb grain score: 6=outstanding, 0=unacceptable.

REPRODUCE LOCALLY. Include form number and edition date on all reproductions. FORM APPROVED - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

Application is required in order to determine if a plant variety protection certificate is to be issued *(7 U.S.C. 2421)*. The information is held confidential until the certificate is issued *(7 U.S.C. 2426)*.

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Colorado Wheat Research Foundation	CO980607	Hatcher
4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*	**5. TELEPHONE** *(Include area code)*	**6. FAX** *(Include area code)*
7100 South Clinton Street Suite 120 Centennial, CO 80112	303-721-3300	303-721-7555
	7. PVPO NUMBER 200500340	

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. **If no, please explain.** ☒ YES ☐ NO

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? **If no, give name of country.** ☒ YES ☐ NO

10. Is the applicant the original owner? ☐ YES ☒ NO **If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?
☐ YES ☐ NO **If no, give name of country**

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?
☒ YES ☐ NO **If no, give name of country**

11. Additional explanation on ownership *(Trace ownership from original breeder to current owner. Use the reverse for extra space if needed)*:

The cultivar Hatcher was developed at Colorado State University by a team led by Dr. Scott Haley, an employee of CSU. By agreement between Dr. Haley and CSU all rights to all wheat cultivars developed by him while employed by CSU are assigned to CSU. Ownership of Hatcher has been transferred from CSU to the Colorado Wheat Research Foundation, Inc. (address above)

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.